2)

$$\begin{cases} V_x(Y_2+Y_3) - V_a \cdot Y_2 - V_2 \cdot Y_3 = 0 \\ V_x(Y_4+Y_5) - V_2 Y_4 = 0 \\ V_x(Y_R+Y_C+Y_1) - V_1 \cdot Y_R - V_a \cdot Y_1 = 0 \end{cases}$$

$$V_x = V_2 \cdot \frac{Y_4}{Y_4+Y_5}$$

$$V_2 \frac{Y_4(Y_2+Y_3)}{Y_4+Y_5} - V_a Y_2 - V_2 Y_3 = 0$$

$$V_a = V_2 \left(\frac{Y_4(Y_2+Y_3)}{Y_2(Y_4+Y_5)} - \frac{Y_3}{Y_2} \right)$$

$$V_2 \frac{Y_4(Y_R+Y_C+Y_1)}{Y_4+Y_5} - V_1 Y_R - V_2 \left(\frac{Y_1 Y_4(Y_2+Y_3)}{Y_2(Y_4+Y_5)} - \frac{Y_1 Y_3}{Y_2} \right) = 0$$

$$V_2 \cdot \frac{Y_2 Y_4(Y_R+Y_C+Y_1) - Y_1 Y_4(Y_2+Y_3) + Y_1 Y_3(Y_4+Y_5)}{Y_2(Y_4+Y_5)} = V_1 Y_R$$

$$V_2 \cdot \frac{Y_R Y_2 Y_4 + Y_C Y_2 Y_4 + \cancel{Y_1 Y_4 Y_4} - \cancel{Y_1 Y_2 Y_4} - \cancel{Y_1 Y_3 Y_4} + \cancel{Y_1 Y_3 Y_4} + Y_1 Y_3 Y_5}{Y_2(Y_4+Y_5)} = V_1 Y_R$$

$$\frac{V_2}{V_1} = \frac{Y_2 Y_R (Y_4+Y_5)}{Y_C Y_2 Y_4 + Y_R Y_2 Y_4 + Y_1 Y_3 Y_5}$$

$$\frac{V_2}{V_1} = \frac{S \frac{C_2}{R} \left(\frac{1}{R_4} + \frac{1}{R_5} \right)}{S^2 \frac{C C_2}{R_4} + S \frac{C_2}{R C_4} + \frac{1}{R_1 R_3 R_5}}$$

$$H(S) = \frac{V_2}{V_1} = \left(\frac{R_4}{R_5} + 1 \right) \frac{S \frac{1}{CR}}{S^2 + S \frac{1}{CR} + \frac{R_4}{C C_2 R_1 R_3 R_5}}$$

Pasabanda 2do orden

$$H(S) = \frac{K \, S \frac{\omega_0}{Q}}{S^2 + S \frac{\omega_0}{Q} + \omega_0^2} \qquad K = \left(\frac{R_4}{R_5} + 1 \right); \quad \frac{\omega_0}{Q} = \frac{1}{CR}; \quad \omega_0^2 = \frac{R_4}{C C_2 R_1 R_3 R_5}$$

Red Normalizada

$C = C_2 = 1 \Rightarrow \frac{\omega_0}{Q} = \frac{1}{R} \Rightarrow Q = R$ //

$R_3 = R_5 = 1 \Rightarrow \omega_0 = 1 \Rightarrow \omega_0^2 = \frac{R_4}{R_1} \Rightarrow R_1 = R_4$ //

$K = R_4 + 1 \Rightarrow R_1 = R_4 = K - 1$ // $\Rightarrow$ Si $K = 10 \Rightarrow R_1 = R_4 = 9$ //